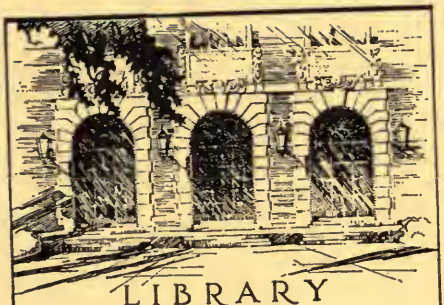

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BULLETIN No. 312

MARKETING CALHOUN COUNTY APPLES

By J. W. Lloyd and H. M. Newell

URBANA, ILLINOIS, JUNE, 1928

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MARKETING CALHOUN COUNTY APPLES

By J. W. Lloyd, Chief in Olericulture, and H. M. Newell,
Assistant in Fruit and Vegetable Marketing

Calhoun county produces approximately one-third of the commercial apple crop of the entire state of Illinois. Without a railroad or a cold-storage plant within the county's borders, with scarcely a packing shed and no marketing organizations, this immense apple crop, averaging nearly 400,000 barrels a year, has found its way into the channels of trade and into the consuming markets.

The methods employed in the grading, packing, transporting, and selling of Calhoun county apples have been made an object of special study with a view to learning the exact conditions existing in the county and offering suggestions that may be helpful in the handling of future crops.

STATISTICS OF APPLE PRODUCTION

In the 35-year period from 1889 to 1924 Calhoun county developed much more rapidly than the rest of the state in reference to apple orchards and apple production (Table 1). The number of apple trees of bearing age in Illinois, was considerably less in 1924 than in 1889, while the number in Calhoun county had been multiplied by three. During the same period the production in Calhoun county increased from 1.2 percent of the total production of the state to more than 14 percent. These figures refer to "total production," and not to "commercial production." They include apples of all varieties and grades produced in farm orchards as well as in commercial orchards. Statistics of commercial production in Illinois are available for 1916 and subsequent years, but separate statistics for commercial production in Calhoun county are available only for 1922 and subsequent years. During the past six years Calhoun county produced from 28.7 to 38.3 percent of the total commercial apple crop of the state, or an average of nearly 33 percent (Table 2) even tho the county contained only 9.7 percent of the trees of bearing age in 1924. Furthermore, in 1924 only 52 percent of the apple trees in the county were of bearing age, while in the state as a whole 61 percent were of bearing age. As the younger orchards come into bearing Calhoun county is likely to produce a still larger percentage of the commercial crop of the state.

The orchards in Calhoun county consist principally of standard commercial varieties, and the younger plantings are mainly of especially desirable sorts, such as Jonathan, Winesap, Willow Twig, and

TABLE 1.—APPLE TREES OF BEARING AGE AND TOTAL PRODUCTION OF APPLES IN ILLINOIS AND IN CALHOUN COUNTY FOR CENSUS YEARS 1889-1924[1]

Year	Illinois	Calhoun county	Percentage in Calhoun county
	Number of apple trees		
1889	6 949 336	126 953	1.8
1899	13 430 006	336 734	2.5
1909	9 900 627	348 888	3.5
1919	5 113 063	294 920	5.7
1924	4 129 330	403 618	9.7
	Total production		
	bu.	*bu.*	
1889	9 600 785	119 109	1.2
1899	9 178 150	319 010	3.4
1909	3 093 321	173 630	5.6
1919	4 673 117	891 317	19.0
1924	5 529 149	815 278	14.7

[1]Data from Census reports.

Delicious. This is an additional factor that will tend to increase the relative importance of the county in reference to commercial apple production.

TABLE 2.—COMMERCIAL APPLE PRODUCTION IN ILLINOIS AND IN CALHOUN COUNTY, 1922-1927 INCLUSIVE

Year	Illinois	Calhoun county	Percentage in Calhoun county
	bbls.	*bbls.*	
1922	1 450 000[1]	416 001[2]	28.7
1923	1 400 000[1]	536 087[2]	38.3
1924	1 100 000[1]	343 699[2]	31.2
1925	1 215 000[1]	451 389[2]	37.1
1926	1 290 000[1]	400 636[2]	31.0
1927	804 000[1]	240 142[3]	29.8
Six-year average	1 209 833	397 992	32.9

[1]From government statistics. [2]From data collected each year by H. J. Sellmeyer, St. Louis, Missouri. [3]From data collected at shipping points by the junior author in company with a representative of the Illinois State Department of Agriculture.

GRADING AND PACKING PRACTICES

Practically all the apples grown in Calhoun county are graded and packed in the orchard.[1] Portable grading tables with canvas bottoms are used. About the only other equipment employed in the packing of barrels consists of a few half-bushel baskets for sorting receptacles, a portable barrel press, and a hatchet. Sometimes a few boards are provided on which the barrels are placed while being packed.

The pickers empty the fruit directly from the picking sacks on to the sorting table. The apples are sorted by hand and placed in half-

[1]Three growers in the county used packing sheds in 1927.

bushel baskets according to grade. When filled, these baskets are lowered into the barrels and emptied. In most cases each sorter has a basket for "facers." The facing is usually done by a person who

FIG. 1.—PACKING APPLES IN ORCHARD, CALHOUN COUNTY

In this important apple-producing area it is the common practice to pack apples in the orchard rather than in a shed. Packages, fruit, and packers are exposed to the weather, and the product naturally suffers.

FIG. 2.—PACKING APPLES NEAR SHED OF C. L. TUREMAN, HARDIN

A few growers have built sheds where they pack apples in bad weather, tho when the weather is favorable they sometimes work just outside the shed.

makes a specialty of facing, or facing and "tailing." In a large crew there is likely to be a separate person for each step in the packing process, including facing, packing, tailing, and heading. A full-sized

harvesting crew consists of four pickers, three or four sorters, one facer, one tailer, one packer, and one header. Such a crew can pack about 100 barrels a day. Smaller crews are often used consisting of only two or three pickers, two sorters, and two men to do the facing, packing, tailing, and heading, making a total of six or seven instead of eleven or twelve.

In basket packing the same general method of handling the apples is employed. The same type of sorting table is used and the apples are commonly sorted into half-bushel baskets and later poured into the bushel baskets or packing forms, tho sometimes they are sorted directly into the bushel baskets or forms.

Growers Usually Do Their Own Packing

Most of the packing is done by crews working under the direct supervision of the grower. In some cases when the crop has been sold before harvest, the crews are under the supervision of the buyer or

FIG. 3.—HAULING EMPTY BARRELS TO THE ORCHARD

A load of barrels just starting from Hardin, where they were coopered. By the use of large racks 100 barrels can be included in a load.

one of his foremen. Occasionally a grower contracts with some person to do the grading and packing at a definite rate per barrel. However, by far the largest part of the Calhoun county crop is packed by the growers themselves even tho they may be under contract to do this work for the buyers. The cost of harvesting and packing apples in Calhoun county orchards (including the cost of the package), based on data furnished by nine different growers, varied from $1.137 to $1.303 a barrel and from 32.2 to 36.0 cents a bushel basket (Table 3). The reports made were in reference to the 1926 crop. Variations in the costs as reported by different growers were due mainly to the fact

TABLE 3.—APPLE PICKING AND PACKING COSTS AS REPORTED BY NINE CALHOUN COUNTY GROWERS FOR 1926 CROP

Grower No.	Picking	Grading and packing	Container and caps	Total
		Barrel packing		
1	$.250	$.315	$.727	$1.292
2	.250	.287	.727	1.264
3	.228	.348	.727	1.303
4	.177	.233	.727	1.137
5	.213	.307	.727	1.247
6	.250	.310	.727	1.287
7	.250	.287	.727	1.264
8	.200	.290	.727	1.217
Average	.227	.297	.727	1.251
		Basket packing		
1	.080	.116	.160	.356
2	.080	.105	.160	.345
3	.080	.120	.160	.360
4	.070	.092	.160	.322
5	.076	.109	.160	.345
6	.070	.127	.160	.357
Average	.076	.111	.160	.347

that crews of the same size did not always pack the same quantity of fruit in a day, some crews being more efficiently organized than others. Also there were some differences in the wages paid by different growers for the same operations.

So far as picking and packing costs are concerned, barrel packing is no more expensive than basket packing, volume for volume, but the price differential between three baskets and one barrel is about 25 cents in favor of the baskets.

Care in Fruit Handling Varies With Crews

The amount of care exercised thruout the process of grading and packing varies greatly with the different packing crews. In some cases the pickers are careless in dumping the fruit upon the sorting table, and considerable bruising results, tho the injury is usually not apparent until the package is opened at the market. In most cases, however, the pickers are reasonably careful in emptying the picking sacks. As a rule the sorters are careful in handling the fruit and it is doubtful if an appreciable amount of bruising occurs at this point in the packing process. Usually the packers are careful in emptying the baskets, but sometimes the fruit is dumped into the barrel instead of being lowered into it.

Sometimes the packers fail to get the proper degree of tightness in the pack. If the fruit is not pressed tightly enough, it becomes slack in transit and is discounted on the market. If, on the other hand, the barrels are filled too full, some of the apples are mashed and others bruised when the head is forced into place. Failure properly to rack or shake the barrels as they are being filled results in too severe pressing or a slack pack, either of which is undesirable and lowers the value of the fruit.

Standardized Grading Not General

The packs of fruit coming from Calhoun county are exceedingly varied. There are no uniformly accepted grade standards. Some growers pack according to the specifications of the Illinois apple grading and packing law, others use the U. S. grade specifications, while many seem to pack according to their individual ideas. Apple dealers who come into the county and buy apples on contract frequently write their own grade specifications into the contracts. These specifications are usually more rigid than the provisions of the Illinois law or the U. S. apple grades. The buyers keep in close touch with the packing of the apples they have under contract and usually such fruit is well graded.

The marks on the fruit packages vary fully as much as the grades in the packages and have no uniformity in meaning. The "orchard run" grade of one grower may be as good a grade as the so-called "No. 1" pack of another. Some growers who pack without reference to any standardized grades mark their packages with Illinois or U. S. grade designations; others use various grade designations of their own selection based upon convenience or personal preference; a few fail to place any grade or descriptive marks on their packages.[1] Thirteen representative lots of Calhoun county apples in cold storage in St. Louis were examined in February, 1926. In each case an entire barrel of fruit was sorted on the basis of U. S. grades (Table 4). Again in December, 1927, examinations were made of Calhoun county apples in storage. Fifteen lots were inspected at this time (Table 5). These apples had been placed in storage for winter and spring sale and undoubtedly represent better grading than many of the apples that are sold for early consumption at harvest time.

If the twenty-eight lots of apples representing the packs of 1925 and 1927 examined in storage are considered together, it will be seen that only one of the lots contained more than 10 percent of culls, while the average percentage of culls was only 3.8. However, of the eleven lots marked *No. 1, U. S. No. 1, Illinois No. 1,* or *"A,"* only one contained 90 percent or more of apples that actually graded U. S. No. 1. The lots marked *No. 1* contained as an average 28.2 percent of No. 2 apples, while those that were not so marked contained as an average 56.7 percent of No. 1 and 38.4 percent of No. 2 fruit.

These observations indicate that errors in the grading of these apples were principally in failure to separate No. 1 and No. 2 fruit

[1]Both the Illinois law and the U. S. grade specifications designate that each package of apples shall be so marked as to give definite information on four items: (1) the name and address of the packer, (2) the name of the variety, (3) the grade of the fruit, and (4) the minimum size or numerical count. Furthermore it is prescribed that the grade designation be worded exactly as in the specifications.

TABLE 4.—INSPECTION OF CALHOUN COUNTY APPLES IN STORAGE, FEBRUARY, 1926

Lot No.	Grade markings	Actual grading		
		U. S. No. 1	U. S. No. 2	Culls
		perct.	*perct.*	*perct.*
1	No. 1, 2½-inch minimum	76.7	16.6	6.7
2	No. 1, 2½-inch minimum	85.9	13.1	1.0
3	No. 1, 2½-inch minimum	70.0	24.5	5.5
4	No. 1, 2½-inch minimum	60.1	30.3	9.5
5	No. 1, 2½-inch minimum	96.5	3.2	.3
6	No. 1	76.9	20.0	3.1
7	No. 1	85.4	13.5	1.1
8	Orchard run, 2¼-inch minimum	70.9	24.1	5.0
9	2¼-inch minimum	56.1	40.9	3.0
10	2¼-inch minimum	57.7	33.6	8.7
11	2¼-inch minimum	73.6	18.7	7.7
12	2½-inch minimum	45.1	31.9	23.0
13	No mark	65.4	26.5	8.1

rather than in the packing of culls. This was undoubtedly a carry-over from the old practice of packing "orchard run" where only the culls were removed. In actual practice there is no more difficulty in separating No. 1 and No. 2 fruit than in separating No. 2's and culls.

Sometimes grade terms are misunderstood by the packer. An example of this is shown in Table 5 (Lot 4). In this case the barrel was labeled "U. S. Commercial." The specifications for U. S. Commercial are the same as for U. S. No. 1 except that there is no color

TABLE 5.—INSPECTION OF CALHOUN COUNTY APPLES IN STORAGE, DECEMBER, 1927

Lot No.	Grade markings	Actual grading		
		U. S. No. 1	U. S. No. 2	Culls
		perct.	*perct.*	*perct.*
1	A, 2½-inch minimum	73	27	..
2	U. S. No. 1, 2½-inch minimum	18	76	6
3	U. S. No. 1, 2½-inch minimum	64	36	..
4	U. S. Commercial	6	86	8
5	Illinois No. 1, 2½-inch minimum	62	34	4
6	Illinois Commercial, 2½-inch minimum	48	50	2
7	Illinois Commercial	64	36	..
8	Orchard run, 2½-inch minimum	48	50	2
9	Orchard run	60	32	8
10	2½-inch minimum	18	79	3
11	2¼-inch minimum	72	28	..
12	No mark	82	16	2
13	No mark	64	36	..
14	No mark	42	56	2
15	No mark	92	8	..

requirement for the U. S. Commercial grade. This barrel graded only 6 percent U. S. No. 1 and 86 percent U. S. No. 2. It would have been correctly marked if labeled either U. S. No. 2 or Illinois Commercial. The U. S. Commercial and Illinois Commercial are entirely different grades. In order to mark packages properly the grade designations must be well understood.

Thru the courtesy of the State Department of Agriculture data were secured regarding the grading of 87 carloads of apples shipped from Calhoun county in the fall of 1927, as shown by inspection at shipping point (Table 6). These 87 cars of apples included 247 lots on which separate inspections were reported. Ten different designations had been used by the various packers to indicate the grade or pack, and four lots were left without any grade designation whatever.

TABLE 6.—CLASSIFICATION OF 87 CARLOADS (247 LOTS) OF CALHOUN COUNTY APPLES INSPECTED AT SHIPPING POINTS, 1927

Mark on packages	Actual grade					Total
	U. S. Fancy	U. S. No. 1	U. S. Commercial	U. S. No. 2	U. S. Unclassified	
U. S. Fancy	2	..	..	..	..	2
Fancy	22	1	..	..	..	23
U. S. No. 1	..	41	3	..	1	45
No. 1	..	34	3	..	5	42
U. S. No. 2	..	..	..	..	..	..
No. 2	..	..	..	11	1	12
2½ inch	..	4	..	4	7	15
2¼ inch	..	2	1	26	39	68
XX	..	..	..	..	28	28
Commercial	..	..	..	1	2	3
Orchard run	..	..	..	2	3	5
No mark	..	2	..	1	1	4
Total	24	84	10	45	87	247

Of the 25 lots marked U. S. Fancy, or Fancy, all except one actually graded U. S. Fancy. Of the 87 lots marked U. S. No. 1, or No. 1, 75 graded U. S. No. 1 and 6 graded U. S. Commercial. Twelve lots were marked No. 2; all except one of these graded U. S. No. 2. The remaining 123 lots, or virtually half the total number, were not marked according to any official grade designation. In the case of 83 lots merely the size was marked; 30 of these graded U. S. No. 2 and 46 fell in the U. S. Unclassified group, which means that they contained too many culls to grade No. 2. The 28 lots marked "XX" were all below the No. 2 grade.

These inspection reports indicate that in the 87 cars of apples under consideration wherever a recognized standard grade designation was marked on the package, a sincere attempt usually had been made to grade the fruit according to the specifications for that grade. However, half the lots in these cars were marked in ways other than with official grade designations and in many instances were of such low grade that they could be officially designated only as Unclassified.

Observations made in the orchards during the harvesting seasons of 1926 and 1927 and on the levee at St. Louis corroborate the evidence already given that there is wide variation in the quality and grade of Calhoun county apples offered on the market. The general average of the grade of the fruit sent to St. Louis is considerably below that of fruit from other important apple-producing regions. St. Louis apple dealers hold the opinion that grading in Calhoun

county is poorer than in most apple sections. On the other hand, a number of Chicago dealers do not thus discriminate against Calhoun county fruit. The reason for the difference in opinion is quite apparent. Most of Chicago's receipts from this section are apples bought and packed by Chicago marketing concerns or consigned by a few of the larger growers. The fruit reaching Chicago is undoubtedly better than the average from the county, while that reaching St. Louis, the market more accessible to inexperienced packers, is probably somewhat below the average.

Calhoun county has not kept pace with most of the important apple-producing regions of the country with reference to improved standards of grading and packing. The lack of standardization as to grade is one of the greatest handicaps under which fruit from Calhoun county is marketed.

PACKAGES USED

The apple barrel has long been recognized as the standard package for fall and winter varieties of apples shipped from Calhoun county, even tho summer varieties and early pickings of fall varieties not intended for storage have been shipped in bushel baskets. However, larger use has been made of the bushel basket from year to year until in 1927 over 55 percent of the total crop was shipped in bushel baskets. Much of the basket fruit was shipped by rail from East Hardin, but data collected at the boat landings show that 44 percent of the fruit shipped by boat was in baskets.

Baskets Tending to Replace Barrels

The barrel is a much stronger package than the basket and better adapted to rough handling and to storage. However, the necessity of rolling the barrels about on the river bank, on the boats, and on the levee in St. Louis results in considerable bruising of the fruit. There is more or less "give" to the bulge of the barrel, and the fruits next to the staves at the middle of the package are often bruised during the process of loading and unloading, tho these bruises may not be apparent until later in the season when the apples are taken from storage. The fact that bushel baskets cannot conveniently be rolled but can be carried without much difficulty results in much more careful handling of this type of package and therefore less bruising of the fruit even tho the package is less rigid. The introduction of the "tub" type of bushel basket is likely to overcome some of the objections against the bushel as a shipping and storage package.[1]

[1]There is some variation in the storage rates quoted by different companies, but several companies in St. Louis quoted the following rates on apples in the fall of 1927 for the season up to April 1: barrels, 70 cents; bushel boxes, 25 cents; bushel baskets, 40 cents. Two firms quoted 30 cents on tub bushels and 40 cents on bushel baskets.

FIG. 4.—BASKETS OF APPLES BEING STACKED ON LEVEE AT ST. LOUIS

The baskets are carried on the shoulder as they are unloaded from the boat. Thus the fruit is not bruised as when rolled in a barrel.

The lower price of baskets as compared with barrels (Table 3) has doubtless been one of the factors responsible for the recent trend among Calhoun county growers to replace the barrel with the basket as a package for winter apples as well as summer varieties.

Apple Box Favored by Some Growers

There is a growing sentiment in Calhoun county in favor of the western apple box as a package for high-grade fruit produced in this section. Two growers are already packing their fruit in boxes and

FIG. 5.—BOXES OF APPLES FROM HAMBURG ON UPPER DECK OF THE *Alabama*

A small quantity of Calhoun county apples are packed in the standard western apple box. This container has much to recommend it. It is convenient and economical in shipment and storage and protects the contents especially well.

others contemplate doing so in the near future. The growers now using boxes wrap their apples in oiled paper and pack them according to numerical count. Special brands are used, designated by attractive lithographed labels on the ends of the boxes.

The western apple box has much to recommend it as a package for Calhoun county. It is a neat and attractive package when properly packed; it is strong and protects its contents well during shipping and handling; it stacks well in storage, and because of this, storage rates on such packages are comparable with rates on barrels rather than on baskets. An added point in favor of the box for Calhoun county is that it must be carried when being loaded and unloaded. This prevents such bruising as is likely to occur in barrels.

TRANSPORTATION IN COUNTY

Calhoun county is bounded, except on the north, by navigable rivers. There is not a railroad in the county nor a bridge across either river. Hence practically all the apples leaving the county must go by boat, transfer barge, or ferry. Since practically all the apples are packed in the orchard, they are hauled in the shipping packages directly from the orchard to the loading point instead of being hauled in field crates from the orchard to a packing shed on the premises of the grower or at a railway siding, as is done in many other regions. The loading point is usually either a steamboat landing on the river bank or a place where a transfer barge or a ferry operates.

Wagons or Trucks Haul Apples to River Landings

Either wagons or trucks are used in hauling the apples from the orchards. The length of the haul varies from less than one-half mile to several miles. During the extremely high water in the fall of 1926 many of the boat landings were unable to operate, so that many growers were forced to haul their apples long distances to other landings. This situation, tho unusual, is likely to recur from time to time.

The character of the roads over which the fruit is hauled varies greatly in different parts of the county and under different weather conditions. The only hard road is that from Hardin to Kampsville. Dirt roads that normally are relatively good are cut into deep ruts after a few days of rainy weather and at times are nearly impassable. Some roads, improved by surfacing with rock and gravel in former years, have not been given proper maintenance and are quite rough and rocky.

The character of the roads has, of course, a very important bearing upon the size of load that each hauling unit can handle and on the number of trips that can be made in a day. It also has a bearing upon the condition and keeping quality of the apples; for it is hard to conceive of any package of apples, even tho well packed, being hauled

four or five miles over rough roads without the fruit being injured to some extent. In slack-packed barrels or baskets the fruit suffers much more.

The use of motor trucks in hauling fruit from the orchard to the loading point is becoming more common each year. Fruit hauled in trucks probably receives more jolting than fruit hauled in wagons properly equipped with springs. However, the speed with which the work can be done by truck seems destined to make the truck the common vehicle for the apple hauling in the near future. Careful driving will eliminate part of the jolting.

Larger loads can be hauled with trucks than with wagons. The load for a wagon usually varies from 12 to 18 barrels, depending largely upon the condition of the roads. Altho small trucks under unfavorable road conditions may haul only 12 barrels, the more usual load for the larger trucks is 18 to 24 barrels, and sometimes even larger loads are hauled.

RIVER TRANSPORTATION HAS CARRIED BULK OF CROP

River transportation has been the dominant factor in the movement of apples from Calhoun county. Shipments to St. Louis, Hannibal, and Peoria have normally traveled the entire distance by water, while those to other markets have moved by boat to some rail shipping

FIG. 6.—STEAMSHIP *Belle of Calhoun* READY TO DISCHARGE CARGO OF APPLES AT ST. LOUIS LEVEE

This is the largest boat engaged in transporting apples from Calhoun county.

point, there to be transferred to cars. This double handling, with the combined charges for boat and rail service previous to the extension of the railroad to East Hardin, made transportation rates high to all markets that could not be reached directly by water. This fact, coupled with the remoteness of other large markets, has caused St.

Louis to be the principal market for Calhoun county apples. In fact, previous to 1927, more apples were shipped from Calhoun county by boat to St. Louis than to all other markets and by all other transportation methods (Table 7).

TABLE 7.—RIVER RECEIPTS OF CALHOUN COUNTY APPLES AT ST. LOUIS, 1922-1927

Year	Calhoun county crop	To St. Louis by river[1]	
	bbls.	*bbls.*	*perct.*
1922	416 001	281 820	67.7
1923	536 087	328 482	61.2
1924	343 699	219 992	64.0
1925	451 389	244 518	54.1
1926	400 636	223 347	55.7
1927	240 142	60 225	25.0

[1]*St. Louis Daily Market Reporter*, November 30, 1927, published by O'Connor Market Reporter Company.

Steamboat Lines Handle Shipments on Illinois and Mississippi Rivers

The part of Calhoun county bordering on the Illinois river is served by the Eagle Packet Company. The steamer, *Golden Eagle,* operates regularly between St. Louis and Peoria, leaving St. Louis twice every week except during the winter months. The steamer, *Piasa,* has hauled apples during harvest time, operating mainly down the river from Calhoun county loading points to St. Louis.

Apples that are shipped by water from the west side of the county are handled by the Tennessee River Packet Company, or by the St. Louis & Calhoun Packet Corporation, operating steamboats on the Mississippi river.

The Tennessee River Packet Company operates boats regularly between St. Louis and Quincy. The schedule is for two trips a week. Three boats of this company are available for use in transporting apples: namely, The *Alabama,* the *Crescent,* and the *Jane Rhea.* During the apple season part of these boats ply between St. Louis and Calhoun county points rather than making the entire trip to Quincy, and they sometimes make three trips a week.

The St. Louis & Calhoun Packet Corporation operates the *Belle of Calhoun* and the *Illinois,* making two trips a week between St. Louis and Louisiana, Missouri. When freight movement is heavy, both boats are operated.

The *Golden Eagle, Piasa, Alabama,* and *Belle of Calhoun* are able to carry large cargoes on their own decks and also may propel one or two barges each, thus greatly increasing their hauling capacity. The *Crescent, Jane Rhea,* and *Illinois* push large barges but carry no freight on their own decks. The boats of the three transportation companies, together with their barges, are capable of moving more than 60,000 barrels of apples a week.

In addition to the boats that have been mentioned, there are several smaller boats that either have their decks laden or push barges, which sometimes handle a considerable volume of apples. They have no particular schedule nor particular route but pick up business whenever and wherever they can do so advantageously.

FIG. 7.—LOADING APPLES ON OPEN DECK OF ONE OF THE SMALLER BOATS

Boats of this type, and also small power boats that push barges, haul many apples in seasons of heavy crop.

FIG. 8.—STREET SCENE IN HAMBURG DURING APPLE HARVEST

When the warehouses at the boat landings have no more room for the apples hauled in from the orchards, the barrels of fruit are piled in the street or along the river bank.

Boats Make Trip to St. Louis Within Twenty-Four Hours

The running time of the packets from Calhoun county landings to St. Louis varies considerably with conditions. When there are

large volumes of freight to be loaded at each landing, more time is required to make the trip than when the loading is light and some stops may be omitted. There are fifteen landings in Calhoun county on the Illinois river and twenty on the Mississippi river at which stops are scheduled; but the boat does not stop at a landing unless there is freight to be delivered or loaded. The stage of the river also has considerable influence on the running time of the boats. Nevertheless, it is seldom that more than twenty-four hours are required to make the trip from the upper landings in the county to the levee at St. Louis.

Delay in getting Calhoun county apples from orchard to market is not due to slow running time of boats on the rivers, but rather to the fact that the boats do not always take all the apples that are at the landings. Sometimes at the peak of the harvest, apples may lie

FIG. 9.—*Golden Eagle* RECEIVING FREIGHT AT HARDIN

The gangplank extends from the warehouse to the boat deck. (The warehouse was damaged when struck by a boat during high water.)

at the landing for several days before a boat comes along that has room to haul them. At other times a grower may request that shipment of his apples be deferred in the hope that market conditions may improve. It has been reported that in extreme cases certain barrels of apples have been at the landing for thirty days before they were loaded.

Warehouses at Boat Landings Inadequate

At most of the boat landings there are sheds or barns which are supposed to serve as warehouses for the apples until they are loaded. In most cases these sheds are owned by the landing keepers, who charge a fee of 3 to 5 cents a barrel on all apples loaded at the given

landing. At most of the landings the warehouses have a capacity of less than 1,000 barrels, tho at Hamburg there is capacity of approximately 5,000 barrels. When the harvest is at its height, more apples

FIG. 10.—ROLLING BARRELED APPLES FROM WAREHOUSE TO STEAMBOAT

Deck hands starting to roll barrels of apples from warehouse across the ground to the gangplank of the steamship *Alabama*. Some livestock had just been loaded and the hurdles forming the chute had not yet been removed when this picture was taken.

FIG. 11.—ANOTHER VIEW OF BARREL LOADING

Each deck hand has a short pike pole with which he manipulates the barrels. This is a common method of loading apples on to boats in Calhoun county.

are brought to the landings than can be placed in the warehouses. The excess packages are piled on the ground wherever space may be found. At Hamburg, in spite of the 5,000-barrel warehouse capacity, it is not uncommon to find the principal street of the town piled high with barrels of apples exposed to rain or sun.

Delays in Shipping Impair Keeping Quality of Fruit

To determine the effects of delayed shipment on the keeping quality of apples, tests were run during 1926 and 1927 on Jonathan, Winesap, and Willow Twig apples grown in Calhoun county.

In 1926 it was planned to ship four barrels of each variety by boat to St. Louis as soon as picked and there to place them in cold storage; four barrels were to have been held in the orchard two weeks exposed to the weather, and four barrels were to have been held in sheds at the loading point for the same period before being sent to storage. Owing to unavoidable conditions some of the lots were delayed in their trip to storage. A misunderstanding caused the Willow Twigs to be shipped to storage a week earlier than planned. The exact number of days elapsing between the picking dates and the dates the various lots were placed in cold storage in St. Louis are shown in Table 8, together with the conditions under which they were held before being stored and the average mean daily temperatures prevailing during the time the various lots were held.

At different times during the storage season one barrel of each lot was removed from storage, and detailed examinations of the apples made. The differences in the condition of the apples in the various lots on specified dates are shown in Table 8.

During the 1927 season tests similar to those made in 1926 were conducted with the same varieties. The apples in these tests, however, were packed in tub bushels. The treatments given the various lots were similar to those planned for the 1926 tests. The time that elapsed between picking the various lots and placing them in cold storage in St. Louis is shown in Table 9, together with the results of detailed examinations made at various times during the storage season.

In both the 1926 and 1927 tests, when a package had been examined and a record of its condition made the fruit was disposed of. The subsequent examinations were made on other packages of the corresponding lots. The results, therefore, could not be expected to be exactly the same for the same lots because the keeping quality of apples in the different packages might vary somewhat even under identical treatment. Significant differences in the keeping quality of the apples handled in different ways are, however, shown in some cases.

There are apparently no significant differences shown in the keeping quality of the Willow Twig lots and the Winesap lots examined in the 1926 tests. The differences noted are too small to be significant. This can partly be explained by the low temperatures that prevailed

TABLE 8.—EFFECT OF DELAYED SHIPMENT ON KEEPING QUALITY OF APPLES IN COLD STORAGE, 1926-1927

	From picking to storage			Decay		Amount of slack		Degree of ripeness[2]	
Jonathan									
Lot No.	Days	Location	Temperature[1]	Dec. 8, 1926	Feb. 4, 1927	Dec. 8, 1926	Feb. 4, 1927	Dec. 8, 1926	Feb. 4, 1927
			°F.	perct.	perct.	in.	in.		
1	12	Shed	66.8	.4	5.5	½	1½	Firm	Ripe
2	19	Orchard	60.8	2.7	13.4	1½	2¾	Firm ripe	Overripe
3	19	Shed	60.8	3.4	15.3	2	4	Ripe	Overripe
4	33	Shed	56.6	11.2	34.3	4	5¼	Overripe	Overripe
Winesap									
Lot No.	Days	Location	Temperature[1]	Mar. 24, 1927	July 20, 1927	Mar. 24, 1927	July 20, 1927	Mar. 24, 1927	July 20, 1927
1	4	In transit	41.5	0	0	None	½	Hard	Firm
2	18	Orchard	45.4	0	1.5	Slight	1	Hard	Firm ripe
3	18	Shed	45.4	0	1.9	None	1	Hard	Firm ripe
Willow Twig									
Lot No.	Days	Location	Temperature[1]	June 20, 1927	Aug. 20, 1927	June 20, 1927	Aug. 20, 1927	June 20, 1927	Aug. 20, 1927
1	4	In transit	48	.4	1.0	None	None	Hard	Firm
2	8	Orchard	47	0	.5	None	¼	Hard	Firm
3	8	Shed	47	0	3.0	None	None	Hard	Firm

[1]Average mean daily temperature for the period taken at Whitehall, Illinois, the nearest weather reporting station.

[2]Terms and definitions: *Hard.*—Mature but with flesh hard and of starchy flavor; apples suitable for long periods of storage for the variety. *Firm.*—Flesh firm and changing from hard to crisp. Juicy with no starchy flavor. Apples suitable for medium periods of storage for the variety. *Firm ripe.*—Flesh crisp, juicy, and in good condition for consumption in the near future. *Ripe.*—Flesh crisp or slightly mealy. Fruit in best condition for immediate consumption. *Overripe.*—Flesh soft and mealy for the variety and showing some signs of tissue breakdown. Apples past their prime for consumption.

TABLE 9.—EFFECT OF DELAYED SHIPMENT ON KEEPING QUALITY OF APPLES IN COLD STORAGE, 1927-1928

	From picking to storage			Decay		Amount of slack		Degree of ripeness[2]	
Jonathan									
Lot No.	Days	Location	Temperature[1]	Dec. 20, 1927	Feb. 21, 1928	Dec. 20, 1927	Feb. 21, 1928	Dec. 20, 1927	Feb. 21, 1928
			°F.	perct.	perct.	in.	in.		
1	3	In transit	53.2	6.3	7.9	Slight	¾	Firm	Ripe
2	23	Orchard	59.6	22.5	51.7	½	1¾	Ripe	Overripe
3	23	Shed	59.6	26.7	40.6	½	1½	Ripe	Overripe
Winesap									
Lot No.	Days	Location	Temperature[1]	Feb. 21, 1928	Apr. 9, 1928	Feb. 21, 1928	Apr. 9, 1928	Feb. 21, 1928	Apr. 9, 1928
1	3	In transit	54.0	0	4.3	None	None	Hard	Hard
2	19	Orchard	60.2	10.2	12.7	Slight	¼	Firm	Firm ripe
3	19	Shed	60.2	8.6	13.2	Slight	½	Firm	Firm ripe
Willow Twig									
Lot No.	Days	Location	Temperature[1]	Feb. 21, 1928	Apr. 9, 1928	Feb. 21, 1928	Apr. 9, 1928	Feb. 21, 1928	Apr. 9, 1928
1	3	In transit	54.0	0	1.3	None	None	Hard	Hard
2	19	Orchard	60.2	5.2	5.9	Slight	¼	Firm ripe	Firm ripe
3	19	Shed	60.2	7.1	8.2	½	¼	Firm ripe	Ripe

[1]See notes to Table 8.

during the time the apples were held before being placed in cold storage and, in the case of the Willow Twigs, by the relatively small difference in the length of time over which the different lots were held before being stored.

The results of the tests on Jonathans, however, indicate that the apples in Lot 1, held in the shed for 12 days, kept significantly better than those of Lots 2, 3, and 4, held longer in orchard and shed. The percentage of decay in Lot 1 was much smaller than in the other lots; the fruit was not as slack in the barrels and did not ripen as rapidly during the storage period.

The results of the 1927 tests, as shown in Table 9, indicate that delay in placing apples in cold storage was very detrimental to the keeping quality of the three varieties tested. In the case of all these varieties the apples that were shipped to storage soon after picking showed much less decay at all later examinations than did those held at the shipping point for two to three weeks before being placed in cold storage. Fruit shipped immediately to storage ripened much less rapidly than fruit held two to three weeks, and the packs remained tight for a much longer period.

In none of the tests did apples held in the orchard with no protection from the weather show significant differences in condition from those held in sheds where they were protected. The packages that were exposed to the weather were, however, not as clean and attractive in appearance as those held in sheds.

These tests show that with normal weather conditions it is detrimental to the keeping quality of apples of midseason and late varieties to withhold them from storage for more than a very few days. Work done by investigators in the U. S. Department of Agriculture shows that prompt storage after apples have been picked is important because it prevents rapid softening of the fruit and because it retards the development of destructive storage rots. It is stated:[1] "At 70° F., softening proceeds approximately twice as rapidly as at 50° F. At 50° F., it is almost double the rate at 40° F., while at the latter temperature softening proceeds fully twice as rapidly as at 32° F." Later in the same publication the investigators say: "It is of fundamental importance that apples intended for cold storage holding be moved to the storage rooms as soon as possible after picking." Brooks, Fisher, and Cooley[2] say: "When fruit is placed in cold storage immediately upon picking, the rots develop slowly, but if the rot organisms can have a week's start on the warm fruit, they will make a rapid growth even at 32° F."

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[1]Magness, J. R., et al. The ripening, storage, and handling of apples. U. S. D. A. Dept. Bul. 1406. 1926.

[2]Brooks, Chas., Cooley, J. S., and Fisher, D. F. Diseases of apples in storage. U. S. D. A. Farmers' Bul. 1160. 1920.

If apples are to be placed on the market in good condition for storing, they must be shipped as soon as packed. Much of the fruit bought at harvest time is bought for storing, and fruit that shows rot or is too ripe for safe storage is usually discounted in price according to its condition. Holding apples in sheds or at loading points in the hope that market conditions will improve is, therefore, likely to be an unprofitable practice.

Rolling of Barreled Apples Adds to Damage

When a packet stops at a landing to pick up freight, the barrels are rolled on their sides directly from the warehouse to the gangplank or down the river bank to the gangplank and on to the boat deck or the barge beside the boat. When the banks are muddy, boards are usually laid down to keep the barrels out of the mud. As the barrels are loaded on the boat they are placed on end in stacks two or three high. Part of the barrels on the boat deck have some protection from the weather, but those on the barge have none.

When the boat lands in St. Louis, the barrels are rolled down the gangplank or runway on to the levee. There they are rolled over the

FIG. 12.—UNLOADING APPLES AT THE LEVEE IN ST. LOUIS

The barrels are rolled down the gangplank and over the cobblestone surface of the levee. Unless tightly packed, considerable bruising of the fruit is likely to result.

cobblestones to the location of their respective lots, where they are stacked on their sides, usually three high, and are left to be disposed of by the dealers to whom they are shipped. The cobblestone surface of the levee is quite rough and it is doubtful if a barrel of apples can be rolled over these stones without bruising some of the fruit. Fruit that was slack-packed or that has been held at the landing too long

before shipment suffers worse than fruit that is tight in the package, but even the best-packed barrels of fruit cannot escape some injury when subjected to such treatment, especially when the handlers are not so careful as they might be in rolling the barrels about on the levee. Baskets and boxes are carried instead of being rolled in loading and unloading and therefore their contents are likely to suffer less injury than the fruit shipped in barrels.

When the apples have been unloaded and piled in individual lots on the levee, the duty of the transportation agency is completed. Apples consigned to the cold-storage houses are hauled away to the coolers soon after they are unloaded. Those intended for sale on the open market are taken in charge by the dealer to whom they are consigned or who may already own them but may wish to dispose of them immediately.

River Rates Uniform on Barrel Shipments to St. Louis

The river freight rates on barrels of apples from Calhoun county are the same regardless of the number of barrels in the shipment. There is no distinction between large and small lots corresponding to the c.l. and l.c.l. railroad rates. Thus the small shipper is at no disadvantage so far as freight rates are concerned. Furthermore, barrels of apples from all boat landings in Calhoun county take the same rate to St. Louis, even tho the nearest landing is only about 40 miles from that city and the farthest approximately 100 miles by the river route. The greatest expense in transporting these apples is in taking on and discharging the cargoes. All labor connected with these operations is furnished by the transportation company. The flat rate tends to equalize the marketing costs for growers in different parts of the county desiring to use the St. Louis market. This rate is 40 cents a barrel. Rates on bushel baskets, boxes, and sacks have differed slightly at different points in the county. From Mississippi river landings the rate on each of these packages in 1927 was 15 cents, while from landings on the Illinois river it was 20 cents. The rate to Peoria from Illinois river landings was 45 cents on barrels and 25 cents on baskets, boxes, and sacks.

FACILITIES FOR RAIL TRANSPORTATION RECENTLY IMPROVED

Altho there are no railroads in Calhoun county, three railway companies have lines that run close enough to the county to receive apples as freight.

Most Important Loading Point on C. & A. at East Hardin

The most important rail loading point for Calhoun county apples is East Hardin, which is directly across the Illinois river from Hardin

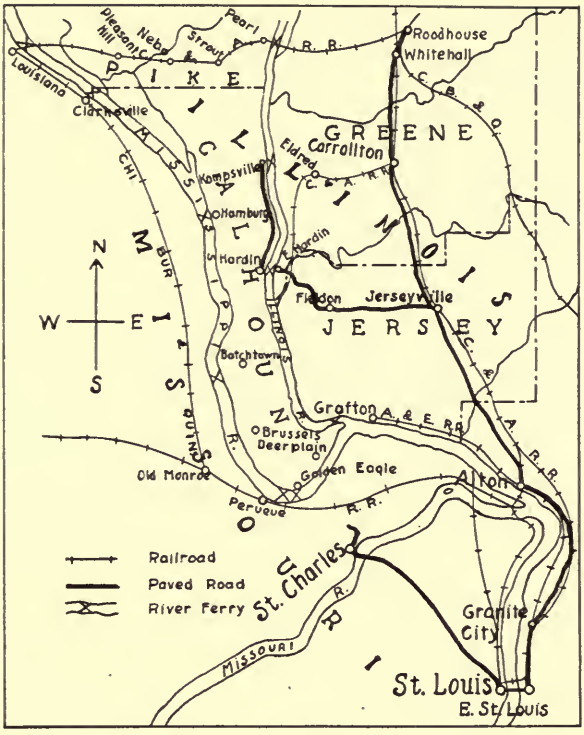

FIG. 13.—MAP OF CALHOUN COUNTY AND VICINITY

The county is nearly surrounded by navigable rivers. Altho there are no railroads in the county, three railway companies have lines sufficiently close to receive apples as freight. Hard roads connect the county with East St. Louis and St. Louis.

and is served by a branch of the Chicago & Alton Railway running from Carrollton, in Greene county. The extension from Eldred to East Hardin was completed in 1925, and thus has been available for rail shipments only three seasons. Previous to the completion of this line shipments might have been made from Eldred by trucking the apples about four miles after crossing the Illinois river by ferry at Kampsville. Very few apples, however, have ever been loaded at Eldred.

Apples May Be Loaded Directly Into Cars at East Hardin

At East Hardin the apples may be loaded into cars from transfer barges or from trucks or wagons that have been ferried across the river. A track extends over the levee and, paralleling the stream for a few hundred yards, descends by a gentle incline into the water,

so that at any stage of the river apples can be loaded directly from transfer barges into the cars. The lower end of the track is always submerged and cars may be backed down the slope as far as may be necessary for convenient loading.

FIG. 14.—RAILROAD TRACK EXTENDING ALONG THE RIVER AT EAST HARDIN

The lower end of the track is submerged. Cars may be "spotted" at any point to facilitate loading of apples directly from barges.

Barges operate between Hardin and East Hardin thru the shipping season. At Hardin the apples are unloaded from trucks or wagons and slid directly down skids and runways on to the barges or are left on the bank until a barge is ready to receive them. Barrels are usually loaded two tiers high on these transfer barges, about 1,250 barrels making a full load. As soon as a barge is loaded, the power boat pushes it across the river, where it is tied up alongside the track. The barrels are then rolled on skids directly into the cars.

The ferry operating between Hardin and East Hardin has sufficient capacity for hauling from six to eight loaded trucks at a time and can make a round trip in about thirty minutes. Many growers prefer this method of getting their fruit to the cars at East Hardin, since there is usually less delay in getting the apples from the orchard to the car and also less handling of the fruit. The ferry charge at this point in 1927 was 5 cents a barrel or 2 cents a basket. There was no charge for the empty truck going back. The rate on the transfer barge was 10 cents a barrel or 5 cents a basket, but in this case the transfer company performed all the labor involved in handling the apples from the time they were unloaded from the shipper's truck at the river bank in Hardin until they were loaded into the cars at East Hardin. When the apples were transferred by ferry, the shipper did his own loading. In 1926 about 80 percent of the apples shipped by rail from East Hardin were transferred across the river by barges; but in 1927 after

the capacity of the ferry had been greatly increased, more apples were transported by ferry than by barge. Rail shipments from East Hardin have been as follows: in 1925, 542 cars; in 1926, 405 cars; in 1927, 311 cars.[1] Many of these cars were iced at Roodhouse before being loaded.

Possibility of a Bridge at Hardin.—It is the expectation that a bridge across the Illinois river at Hardin and East Hardin will be constructed in the near future. Appropriations have been made by the state for the construction of this bridge and the plans are practically completed. When the bridge is finished, it will be possible to truck apples directly from the orchards to the team tracks in East Hardin without the use of barge or ferry and this will tend greatly to increase shipments at this point.

Loading Points Available on C. B. & Q. in Missouri

The Chicago, Burlington & Quincy Railroad runs along the west side of the Mississippi river from St. Louis to Hannibal and makes connections there for Quincy, Kansas City, Chicago, Minneapolis, and other markets. At Peruque, Missouri, the tracks are only about one-fourth of a mile from the river. A few apples ferried across the river on trucks at this point are loaded into cars for shipment. At one time there was a spur track extending into the river at Peruque like the one at East Hardin, but this was removed when the brick plant across the river ceased to operate. There has been, at various times, some agitation among the growers in the southern part of the county to have this track replaced so that apples may be loaded from barges into cars at this point. The ferry goes a considerable distance up the river from Golden Eagle to Peruque, requiring about 1½ hours to make the round trip. The ferry charge is one dollar each way for a truck regardless of its size.

North of Peruque the C. B. & Q. swings away from the river and there are no other readily accessible loading points until Clarksville is reached. Here the railway sidings are about a quarter mile from the river landing point for transfer barges. Clarksville, Missouri, is about 15 miles upstream from Hamburg, Illinois, which is the largest apple shipping point in Calhoun county. In spite of this distance a considerable volume of apples is brought on transfer barges from Hamburg to Clarksville and there loaded into cars.

When shipments are heavy, two barges are in operation between these points. The shippers deliver their apples at a warehouse in Hamburg. The transfer companies handle them from that point to the cars, including the wagon haul from the landing at Clarksville to the railroad. During the busy season one round trip is usually made by each barge every twenty-four hours. The transfer charge in 1927 was 25 cents a barrel, including the warehouse fee at the loading point.

[1]Data furnished by Traffic Department of Chicago & Alton Railroad.

In 1925, 177 cars of apples were shipped from Clarksville. Most of these apples came from Calhoun county and went to Chicago. In 1926 the shipments from this point amounted to 264 cars and in 1927, 127 cars.[1] Many of the cars shipped from Clarksville were iced at Hannibal before being loaded.

Apples Ferried Across River Loaded at Grafton

Grafton, in Jersey county, is served by the Alton & Eastern Railroad. A good many apples loaded in trucks are ferried across the Illinois river below Deerplain and hauled to Grafton for loading into cars. To reach the ferry from the nearest orchards the apples must be hauled two to three miles over dirt and macadam roads thru the river bottoms. After crossing the ferry the trucks must cover more than three miles of rough road, partly dirt and partly improved, to reach the loading tracks at Grafton. The transfer charge at this ferry in 1927 was one dollar for each truck one way. The round trip rate was $1.50 for trucks under two tons, and $2 for trucks of two-ton capacity or over. This would be about 7½ cents a barrel for average loads on 1½- and 2-ton trucks. The ferry at this point is small and can haul only one or two trucks at a load. If large quantities of fruit were to be handled here, considerable increase in transfer facilities would be necessary.

Another way in which apples might be taken to Grafton for shipment by rail would be to transport them by packet from any river landing in the county and transfer them by wagon or truck from the landing at Grafton to the cars. Or the same method might be employed for loading them into cars at Alton or St. Louis. The rate by packet is the same whether the apples are unloaded at Grafton, Alton, or St. Louis. The total charge for getting a barrel of apples from the boat landing in Calhoun county to the cars at any of these points is approximately 45 cents besides the drayage charge. This expense is involved before the apples are even started by rail. This method also involves considerable delay before the fruit can be put under refrigeration and requires a large amount of handling which impairs rather than improves the keeping quality of the apples. It is therefore seldom used.

Shipments of Calhoun county apples by rail from Grafton during the last three years have been approximately as follows: 1925, 100 cars; 1926, 100 cars; 1927, 70 cars.[2]

The Chicago & Alton line from Kansas City, Missouri, to Springfield, Illinois, passes thru Pike county about three miles from the

[1]Data furnished by General Freight Department of Missouri District of C. B. & Q. Ry.

[2]Data furnished by Freight Department of A. & E. R. R. and station agent at Grafton.

north boundary of Calhoun county. Up to the present time relatively few apples have been produced in the extreme north end of the county and shipping points on this railway line have been of little importance in moving the crop, tho some Calhoun county apples have been shipped from Pleasant Hill and from Nebo. Shipments from Pleasant Hill were 3 cars in 1925, 5 cars in 1926, and 5 cars in 1927.[1] Shipments from Nebo were 7 cars in 1926, and 3 cars in 1927.[1] The orchards in Calhoun county close to Nebo are just coming into bearing and it is probable that rail shipments from this point will show a marked increase in the near future.

Freight Rates to Various Markets

Railway freight rates on apples from the principal loading points accessible to Calhoun county growers to some of the important markets are given in Table 10.

TABLE 10.—CARLOT FREIGHT RATES ON BARREL AND BASKET APPLES FROM POINTS ACCESSIBLE TO CALHOUN COUNTY[1]
(Rate in cents per cwt.[2])

From	East Hardin	Grafton	Clarksville
To—			
East St. Louis	13	11	....
St. Louis	20	18	14.5
Chicago	22	27.5	20.5
Kansas City	32	32	26.5
Memphis	42.5	42.5	42.5
Cincinnati	32	30.5	42
Minneapolis	44	44	44

[1]Data furnished by the railway companies concerned, winter of 1927-28.
[2]Icing charges are not included in these rates.

The rail rate from East Hardin to St. Louis in carload lots (without refrigeration) is 10 cents a barrel less than the river rate but does not include the transfer by ferry or barge to the rail loading point nor unloading at destination. The rail rate from Clarksville to St. Louis is only slightly over half the river rate from Hamburg, but to this rail rate must be added the 25 cents per barrel charge for the transfer by barge from Hamburg to Clarksville, thus making the total cost of transportation by barge and rail greater than by boat.

Boat Shipments Faster Than Rail From East Hardin to St. Louis

Shipments by rail from Clarksville, which leave that loading point in the evening, normally reach St. Louis by the next morning, but rail shipments from East Hardin may require two or three days to reach the same market. River transportation usually requires no more than 24 hours from any loading point in Calhoun county to St. Louis.

[1]Data furnished by Traffic Department of Chicago & Alton Railroad and station agents at Pleasant Hill and Nebo.

FIG. 15.—RIVER SCENE AT HARDIN

In the foreground are barges loaded with apples and a power boat for transferring the barges to East Hardin. In the background is the steamship *Golden Eagle* that hauls apples to Peoria or St. Louis.

FIG. 16.—FROM BARGE TO REFRIGERATOR CARS AT EAST HARDIN

The barrels of apples are being rolled on a skid directly from the transfer barge to the refrigerator car. The transfer company does the loading.

Possibility of a Railroad in Calhoun County

The construction of a railroad running thru Calhoun county from north to south has been projected and a right of way over a large part of the distance has been acquired. The completion of such a railroad would connect this apple region with Quincy on the north and St. Louis on the south and entirely change the situation in reference to rail transportation.

MOTOR TRUCKS HAUL MANY APPLES TO MARKET

Motor trucks are becoming more and more important in the transportation of apples from Calhoun county to market. For several years it has been customary to haul considerable quantities of the early varieties and early pickings of Grimes and Jonathans packed in baskets directly from the orchards in the southern part of the county to the stores of dealers in St. Louis. Bulk apples have also been trucked from the same area to St. Louis and surrounding towns.

Some growers do their own trucking, but there are now owners of commercially operated trucks who make a regular business of hauling

FIG. 17.—BASKETS OF APPLES LOADED FROM TRUCK INTO REFRIGERATOR CARS AT EAST HARDIN

The trucks are ferried across the river. Some growers prefer this method to transfer by barge, since it involves less handling of the fruit and less delay in loading.

apples to St. Louis. In either case the apples are loaded into the truck at the orchard and delivered at any dealer's store or any cold storage plant in St. Louis without rehandling. The trucks cross the Mississippi river by ferry at Golden Eagle. There are two ferries operating at this point. Each is capable of carrying five or six good-sized trucks. Most of the trip from the ferry to St. Louis (a distance of 38 miles), via St. Charles, Missouri, is over gravel or concrete roads, tho there are three or four miles of road that are in poor condition in wet weather. Under normal conditions a truck can make the trip from the ferry to St. Louis in about two hours. A common load for a one-ton truck is 45 bushel baskets. Some of the larger trucks haul more than 100 baskets. Few, if any, apples in barrels have been hauled to St Louis by truck. Commercial trucking companies in 1927 charged 25 cents a bushel basket for hauling apples from the orchards around Brussels, Batchtown, and Golden Eagle to any point in St. Louis. In 1926, 80,000 bushels of apples in trucks crossed the river by ferry at

Golden Eagle. In 1927, when the crop was light, there were 105,000 bushels.

After the close of the apple harvest in 1927 the concrete road from East Hardin to Jerseyville was completed. This affords thru connections over hard roads all the way from East Hardin to St. Louis via Jerseyville and Alton. The distance is 68 miles. Undoubtedly considerable volumes of fruit from the territory near Hardin and along the concrete highway between Hardin and Kampsville will be moved to St. Louis by truck during the next apple harvest. This new road not only makes the St. Louis market readily accessible by truck from the eastern part of Calhoun county, but also makes it possible to

FIG. 18.—CIDER MILL NEAR HARDIN

In 1927 about 8 percent of the apple crop of Calhoun county was made into cider. This was used mostly by pickle companies for making vinegar, and was shipped out largely in tank boats.

reach a number of well-populated industrial communities in the vicinity of East St. Louis. It has been estimated that the combined population of these industrial centers is more than 160,000, thus affording a potential market for many apples.

The quantities of apples shipped from Calhoun county in 1927 by the various means of transportation are given in Table 11. Thirty-eight percent of the crop was shipped by rail, 30.5 percent by river packet, and nearly 23 percent by truck. In addition, more than 8 percent was shipped out in the form of cider, mostly by river boat.

TABLE 11.—TOTAL APPLE SHIPMENTS FROM CALHOUN COUNTY, 1927

	Barrels[1]	Percent of total
By packet, on rivers	73 434	30.5
By rail	91 528	38.1
By truck, via ferry	55 167	22.9
As cider[2]	20 013	8.3
Total	240 142	99.8

[1]Including baskets and boxes calculated as 3 to the barrel.
[2]Calculated on the basis of 1 barrel of apples to 10.7 gallons of cider.

STORAGE FACILITIES ACCESSIBLE

There are no cold-storage facilities in Calhoun county. A few growers have dry storage houses in which they place a small portion of their crops. Fruit held in these houses until spring is usually quite ripe and will not long remain firm when taken from storage. It must be handled rapidly and usually sells at a discount because it must compete on the market with sound fruit from cold storage. This situation has led to some discussion regarding the feasibility of erecting cold-storage warehouses especially for handling apples produced in Calhoun county.

Altho there are no cold-storage plants in the county, ample facilities for storing Calhoun county apples are available. In St. Louis alone there are seven storage plants having a total apple capacity of approximately 460,000 barrels (Table 12).

TABLE 12.—COLD STORAGE SPACE FOR APPLES NEAR CALHOUN COUNTY

City	Capacity[1]
	bbls.
St. Louis	462 000
Hannibal	76 000
Louisiana, Missouri	35 000
Peoria	30 000
Total	603 000

[1]As reported by cold storage companies, or calculated on basis of 160 barrels to a carload, or 8 cubic feet of space for a barrel.

Hannibal and Louisiana, Missouri, are readily accessible by boat from Calhoun county and can also be reached by rail if the apples are loaded at Clarksville after being transferred by barge from Hamburg. These towns have considerable storage space and good rail connections for shipping apples from storage to various markets. Peoria, accessible by boat or rail, is an important distributing point and a logical place to store apples for shipment to markets farther east. The storage capacity in Peoria available for apples is about 30,000 barrels (Table 12). Quincy is another point at which apples from Calhoun county might be stored.

The quantities of apples stored in St. Louis the past three seasons have been: for 1925, 252,668 barrels; 1926, 179,893 barrels; and 1927, 179,712 barrels (Table 13). Of these, 169,961, 114,356, and 39,664 barrels respectively for the three seasons were from Calhoun county. The St. Louis storage of Calhoun county apples represented 37.6, 28.5, and 16.5 percent respectively of the crop for these three years. There is ample storage space in St. Louis for many more apples from Calhoun county than have been stored there the past three seasons.

In view of the storage space available for apples in St. Louis, Hannibal, Louisiana, and Peoria, not to mention Chicago and other distributing markets, there would seem to be no adequate reason for the erection of cold-storage plants in Calhoun county. Such plants

FIG. 19.—UNLOADING APPLES FROM WAGON INTO WAREHOUSE AT HAMBURG

By the use of a skid one man handles the barrels with ease. In hauling the apples over the hilly roads, brakes are used on the wagons and the load is roped to hold it in place.

would be expensive to build and operate, and there would be no revenue from the storage of products other than apples during the summer season as is possible in storage plants in large cities. At no point in the county could apples be loaded from a storage plant directly into

TABLE 13.—QUANTITIES OF APPLES STORED IN ST. LOUIS, 1925, 1926, AND 1927[1]

Storage package and year	Volume of apples stored in St. Louis	Calhoun county apples stored in St. Louis		Percentage of Calhoun county apples stored in grower's name
		Volume	Percentage of total stored in St. Louis	
Barrels				
1925	162 004	145 615	89.9	9.08
1926	116 585	107 848	92.5	13.57
1927	27 069	25 196	93.1	9.8
Baskets				
1925	51 237	17 002	33.2	28.7
1926	27 915	13 204	47.3	26.45
1927	182 938	32 454	17.75	39.0
Boxes				
1925	220 756	6 868	3.1	99.2
1926	162 009	6 321	3.9	100
1927	275 992	10 951	3.97	100
Total as barrels. .				
1925	252 668	169 961	67.3	10.05
1926	179 893	114 356	63.6	15.77
1927	179 712	39 664	22.1	26.05

[1]Compiled from data furnished by the cold-storage companies. Storage space available in St. Louis, 462,000 barrels.

refrigerator cars, and river transportation to market is not available in winter. If a cold-storage plant were erected at East Hardin, just outside the county, the loading of cars could readily be handled in winter, but the lack of summer revenue would be a serious obstacle to the profitable operation of such a plant; and in years of light crop in Calhoun county even the winter revenue would be reduced since the location is not favorable for shipping in apples from other regions for storage purposes.

METHODS OF SALE

Calhoun county apple growers have used a number of different methods of selling their fruit. Considerable quantities of the apples usually are sold long before the harvest. Other quantities are sold at harvest time but before the fruit is shipped. Much fruit is shipped on consignment to large markets. Smaller quantities have been sold thru brokers or stored by the growers and later sold. Numerous variations of these methods have been widely used from time to time, and the quantities sold in the various ways have varied considerably from year to year.

Pre-Harvest Contracts

It has been a common practice for apple buyers to come to Calhoun county in June, July, or August, and begin operations for the season. These buyers usually represent large produce firms in important markets. A buyer visits a number of orchards inspecting the fruit and estimating the crop. He then bargains with the owner of any orchard that interests him and they attempt to reach an agreement as to price and method of selling. If an agreement is reached, a contract is usually drawn up stating the price to be paid, basis of grading, and other points of importance. In some cases, however, such transactions take place without a written contract being signed. The buyer usually pays the grower a part of the purchase price at the time the contract is made and agrees to pay the balance when the fruit is shipped.

The buyer may pay a lump sum for the entire crop on the trees. The fruit then becomes his property and he assumes all risks due to adverse weather conditions or possible insect and disease damage. The buyer makes all arrangements for handling the crop and pays all expenses of these operations. He may hire the grower to harvest, pack, and haul the crop at a stated rate per barrel or he may handle the crop with his own crews.

Some buyers are unable to estimate accurately the size of a crop on the trees before harvest time. During some years adverse weather conditions have caused large quantities of fruit to be lost before it could be picked and packed. Often the buyer does not wish to assume the risks that must be borne when a crop is bought on the trees several

weeks before the harvest. In such cases the buyer agrees to pay a stated price for the crop packed and delivered at the loading point. A flat price per package is usually paid for both No. 1 and No. 2 fruit, and the grade specifications are stipulated by the buyer. Such a price is made as will allow a fair return for the costs of harvesting, packing, and hauling to the loading point in addition to the price for the fruit. Under such an agreement the buyer may purchase the grower's entire crop or he may buy only certain varieties. When only certain varieties are bought, the buyer may arrange to have the remainder of the grower's crop handled by his company for the grower's account. Contracts in which the crop is bought at a definite rate per barrel are usually written, and the grade specifications under which the fruit is to be packed are included. Here also the buyer usually advances the grower a part of the money when the contract is signed and agrees to pay the balance when the fruit is delivered for shipment. When this method of sale is employed, the grower does all of the harvesting, packing, and hauling. The buyer, however, usually visits the orchard once or twice each day to see that the grading is being done according to specifications and that the fruit is properly packed.

Sometimes a buyer does not begin his operations until harvest time. In such cases he may go into orchards where the growers have not yet sold their crops. If the quality and condition of the fruit being packed is satisfactory to him, he attempts to buy it. If a sale is made, the price agreed upon usually applies to the fruit delivered at the loading point.

The buyer, instead of visiting the orchards, may work at the loading points (usually boat landings) and there inspect various lots of fruit as they are hauled in from the orchards. He then attempts to buy those lots which seem desirable to him.

Consignments to Commission Merchants

Most of the fruit not bought up by apple dealers is shipped on consignment to commission merchants in the larger markets. This is the most widely used method of selling Calhoun county apples. Altho some consigned fruit is sent to Chicago and other markets, by far the largest part of such fruit is shipped by boat to St. Louis and is there sold in the apple sales that are held on the levee nearly every day during the shipping season.

Some growers in Calhoun county have used this method regularly and have shipped consistently year after year to one or two representatives in this market. Others have consigned consistently to St. Louis but have not formed any permanent market connections there. These growers ship first to one dealer and then to another, their choice depending upon how satisfactory the preceding returns have been. Sometimes growers divide shipments among several different dealers and send later shipments to the one who makes the most satisfactory

returns. Other growers ship on consignment only when they have been unable to interest buyers in their fruit or when they and the buyers have been unable to agree upon a price. These growers usually have no regular market representative, and consequently their fruit has little standing on the market.

The Levee Sale at St. Louis

An auction sale of apples takes place on the levee at St. Louis whenever the boats bring down enough fruit to justify a sale. The sales usually begin about ten o'clock in the morning or about two o'clock in the afternoon. The fruit has been piled in lots that are numbered. Each commission merchant receives from the boat clerk a list of the lots consigned to him. When the time for the sale arrives,

FIG. 20.—BARRELS OF APPLES ON LEVEE AT ST. LOUIS

The apples are brought by boat from Calhoun county and piled up on the levee in readiness for the auction sales which take place nearly every day during the apple harvest.

the commission merchant opens one or two packages of a lot of apples and invites prospective buyers to examine them. He then passes slips of paper to those who wish to bid on the lot. The bids are written on the slips of paper and handed to the dealer selling the fruit. He examines the bids, tears up all the slips except the one containing the highest bid, and announces the successful bidder. A sales ticket is then made out for the lot and the buyer arranges for the disposition of his purchase. This process is repeated by the different commission merchants having fruit to sell until all of the lots are disposed of or until the buyers leave. Frequently large quantities of apples cannot be disposed of at one sale. Those not sold then are held over until the next sale which usually takes place that afternoon or the next day. The commission charged for making sales on the levee is 10 percent.

Sometimes a prospective buyer sees a lot of apples which he is particularly anxious to obtain. He may, in that case, arrange to inspect them and to have the commission merchant set a price on the lot. If the price is agreeable, he may buy the fruit without bidding for it. This is more often done with highly desirable lots of apples than with fruit of ordinary grade and pack, and the resulting price is correspondingly greater. When a lot of apples is offered for sale and bids are solicited, the usual custom is for the highest bidder to be given that lot of apples at the figure he bids. The salesman may, however, announce before the bidding begins that if the price is not satisfactory he reserves the right to withdraw the lot from sale. This is seldom done except with high-grade fruit in good condition for storing and then only when the commission merchant has some such agreement with the shipper. Fruit that is only fair in quality or condition is usually sold for what it will bring because storage of such fruit is seldom profitable.

When supplies are heavy and demand slow, any market is usually dull. The market at the levee is not exempt from this condition. At such times it is very difficult to get satisfactory prices for the best of fruit, and off-grade fruit in poor condition sells for very little. The grower who ships poorly graded fruit that is also in poor condition, is greatly handicapped when his product strikes such a market because it cannot be stored with any assurance of profit and because its value on such a market is extremely low. Likewise a shipper shipping to a dealer with whom he has no well-established connections and no agreement to cover such circumstances, is likely to find his fruit being sold at a low price because his representative has no authority to store it when unable to make a satisfactory immediate sale.

This apple sale on the levee often has been condemned as detrimental to the interests of Calhoun county growers. It undoubtedly has its faults. However, it performs a distinct service in evaluating and disposing of numerous small lots of apples of every grade, condition, and description.

Brokerage Sales a Factor in 1927

Recently some fruit from Calhoun county has been sold on a brokerage basis. Part of this fruit was sold at harvest time and part was stored for selling later in the season. The growers who arranged to have their fruit handled in this way designated whether they wished it sold at once or stored. The time of selling from storage was left to the discretion of the broker. In general the selling was distributed thru the whole storage season. The freight from the shipping point to the storage house was paid by the broker and deducted from the sales along with storage and brokerage charges when returns were made. The brokerage charge was a flat rate per package regardless of the selling price of the fruit.

Merits of Different Methods

Each of the various methods of marketing has its merits. Selling to a reliable dealer for a lump sum in advance of the harvest relieves the grower of all risks due to subsequent storms, insect invasions, and market fluctuations, and gives him money to pay operating expense. On the other hand, the assumption of these risks by the dealer is presumably covered by his margin in price.

If the apples are sold at an agreed price per barrel in advance of the harvest, the grower assumes the risk of loss by storms and the buyer the risk of price fluctuation. In this case the risks are divided between the grower and the buyer. Waiting for buyers to appear at the orchard or river bank during the harvest is probably the most undesirable way of marketing. The expected buyers may fail to come. In such cases shipments are delayed, transportation facilities congested, and ultimate consignment often the only recourse.

When apples are shipped on consignment, the grower assumes all risks and expenses until the goods are actually sold, but on the other hand receives the benefit of any favorable changes in market values from day to day. Brokerage sales are associated with wider distribution of the fruit, as to time and place, and lower selling costs than the charge for commission sales, especially when market values are high.

STORING FOR LATER SALE

Some years considerable quantities of fruit have been placed in cold storage by the growers. Some growers store fruit every year. In many cases, however, they store only when the price offered by buyers does not seem satisfactory to them or when the market price for fruit at harvest time is low. In years of good prices at harvest time the amount of fruit stored by the growers is likely to be small.

At best apple storage must be considered a speculative enterprise. Low prices at harvest time may be due to a large crop of apples in the country as a whole, business depression thruout the country, large crops of other fruits that compete with the apple, or to combinations of these and other factors. Under such circumstances increases in the price of apples during storage may or may not be sufficient to cover the costs of storage and the risks involved. It is usually difficult to predict with accuracy the future trend of the market. Most growers do not have access to enough reliable information concerning supplies of apples and competing fruits and concerning the other factors influencing the price at harvest time to judge accurately the price that may be offered for stored fruit. Sometimes men experienced in fruit marketing who have all available information are unable accurately to judge the situation.

TABLE 14.—MONTHLY AVERAGE PRICES OF JONATHAN, WINESAP, BEN DAVIS, AND WILLOW TWIG APPLES ON ST. LOUIS MARKET, 1920-1927[1]

Variety of apple and year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Jonathan									
1920-21	$5.84	$6.58	$....	$7.85	$7.08	$7.25	$....	$....	$....
1922-23[2]	3.60	2.89	....	4.42	4.53	4.79	4.44	....	....
1923-24	4.29	4.31	....	4.66	4.40	4.06	4.43	4.33	4.81
1924-25	5.14	5.87[3]	7.25[3]	8.00	8.64	9.03	....	....	....
1925-26	4.54	4.31	4.71	3.94	3.03	3.08	2.38	....	....
1926-27	3.03	3.10	....	3.71	4.07	4.51	....	....	....
1927-28	6.20	7.27	7.61	6.31	5.37	6.13	6.38	....	....
Average	4.66	4.90	6.52	5.56	5.30	5.55	4.41	....	....
Winesap									
1920-21	....	5.18	5.12	....	7.50	7.25	7.00	....	....
1922-23	....	3.56	3.41	5.38	5.36	5.47	5.19	6.23	7.00[3]
1923-24	....	3.97	3.99	4.66	4.43	4.00	4.32	3.83	4.00
1924-25	....	5.46	6.44	7.50	8.79	9.31	8.33	7.94	8.17[3]
1925-26	....	4.74	3.67[3]	6.23	....	5.07	4.19	....	....
1926-27	....	2.80[3]	2.76	3.71[3]	4.11	4.02	4.01	4.57	4.87
1927-28	....	4.39[4]	4.65[4]	([5])	....	....	....	....	....
Average	....	4.30	4.23	5.50	6.04	5.85	5.51	5.64	6.01
Ben Davis									
1920-21	3.55	3.81	3.55	4.00	4.80	5.10	5.06	5.18	5.92
1922-23	....	2.41	2.09	3.38	3.50	3.59	3.99	3.98	4.77
1923-24	....	2.49	2.27	3.32	3.38	3.43	3.36	2.62	2.34
1924-25	....	3.14	4.09	4.89	5.35	5.54	5.70	5.35	5.29
1925-26	2.33	2.76	3.43	3.99	3.79	3.52	2.97	2.86	2.96
1926-27	....	2.35	2.22	3.19	3.35	3.88	3.66	3.68	3.08
1927-28	....	3.74	4.79	5.50	....	6.04	6.16	6.75	6.28
Average	2.94	2.96	3.21	4.04	4.03	4.44	4.41	4.38	4.38
Willow Twig									
1920-21	....	5.18	5.25	5.85	6.73	6.63	6.00	6.97	8.50
1922-23	....	3.30	3.66	4.69	5.02	4.80	5.19	6.43	7.87
1923-24	....	4.60[3]	3.98	4.32	....	5.00[3]	4.50	3.81	4.64
1924-25	....	5.69	5.60	....	9.25	9.50	8.38	8.06	8.17
1925-26	....	4.25	3.51	4.15	....	5.00	4.19	4.77	5.06
1926-27	....	2.99	2.76	....	....	4.44	4.50	5.26	6.00
1927-28	....	5.26	5.75	....	7.50	7.06	7.58	8.25	8.76
Average	....	4.47	4.36	4.75	7.13	6.06	5.76	6.22	7.00

[1]Compiled from *St. Louis Daily Market Reporter*, published by O'Conner Market Reporter Company. Based on quotations every third day. [2]No quotations in 1921-22 on account of crop failure in Calhoun county. [3]Average based on only three quotations. [4]Not included in the average below. [5]No quotations on barreled Winesaps in St. Louis after November, 1927, on account of crop shortage.

Study of Apple Prices

Changes in prices of apples that have occurred between the time of harvest and the end of the storage season each year from 1920 to 1927 are illustrated in Table 14. The average monthly prices of barreled Jonathan, Winesap, Ben Davis, and Willow Twig apples on the St. Louis market, as given in this table, were calculated from data secured from the *St. Louis Daily Market Reporter*. To expedite the

TABLE 15.—PRICES OF APPLES AT HARVEST TIME AND FROM STORAGE IN ST. LOUIS, 1920-1927

Variety of apple and year	Harvest price	Average price from storage	Costs of storage and interest	Margin
Jonathan	*Sept.*	*Dec.-Feb.*		
1920-21	$5.84	$7.39	$.70 + .12 = .82	$ .73
1922-23	3.60	4.58	.70 + .08 = .78	.20
1923-24	4.29	4.37	.70 + .09 = .79	− .71
1924-25	5.14	8.56	.70 + .11 = .81	2.61
1925-26	4.54	3.35	.70 + .10 = .80	−1.99
1926-27	3.03	4.10	.70 + .07 = .77	.30
1927-28	6.20	5.94	.70 + .13 = .83	−1.09
Average	4.66	5.47	.70 + .10 = .80	.01
Winesap	*Oct.-Nov.*	*Jan.-Apr.*		
1920-21	5.15	7.25	.70 + .11 = .81	1.29
1922-23	3.49	5.56	.70 + .07 = .77	1.30
1923-24	3.98	4.15	.70 + .08 = .78	− .61
1924-25	5.95	8.59	.70 + .12 = .82	1.82
1925-26	4.21	4.63	.70 + .09 = .79	− .37
1926-27	2.83	4.18	.70 + .06 = .76	.59
1927-28	4.52[1]	[2]		
Average	4.27	5.73	.70 + .09 = .79	.67
Ben Davis	*Oct-.Nov.*	*Feb.-May*		
1920-21	3.68	5.32	.80 + .10 = .90	.74
1922-23	2.25	4.08	.80 + .06 = .86	.93
1923-24	2.38	2.94	.80 + .06 = .86	− .30
1924-25	3.61	5.47	.80 + .09 = .89	.97
1925-26	3.10	3.08	.80 + .08 = .88	− .90
1926-27	2.29	3.57	.80 + .06 = .86	.42
1927-28	4.27	6.31	.80 + .11 = .91	1.14
Average	3.08	4.40	.80 + .08 = .88	.44
Willow Twig	*Oct.-Nov.*	*Feb.-May*		
1920-21	5.22	7.03	.80 + .13 = .93	.88
1922-23	3.48	6.02	.80 + .09 = .89	1.65
1923-24	4.29	4.49	.80 + .12 = .92	− .72
1924-25	5.65	8.53	.80 + .15 = .95	1.93
1925-26	3.88	4.76	.80 + .10 = .90	− .02
1926-27	2.88	5.05	.80 + .08 = .88	1.29
1927-28	5.51	7.91	.80 + .14 = .94	1.18
Average	4.41	6.26	.80 + .12 = .92	.90

[1]Not included in the average below. [2]No quotations on barreled Winesaps in St. Louis after November on account of crop shortage.

compiling of the records, quotations for every third day only were considered. This usually resulted in nine quotations for the month. To test the accuracy of this method the monthly averages thus secured for the season of 1926-1927 were compared with the monthly averages based on daily quotations for the same season. In most cases the difference in the monthly averages obtained by the two methods were from 2 to 4 cents a barrel, the maximum difference being 11 cents for one variety one month. Some months one method gave the higher

average and in other months the other method. Thus the variations from month to month practically balanced one another, so that there were no essential differences in the averages obtained by the two methods. The quotation used each day was the average between the high and the low quotation for No. 1 fruit in good condition as given in the *Market Reporter.* St. Louis quotations on apples in barrels refer almost exclusively to Calhoun county stock.

The prices of the four varieties at harvest time, the average selling prices from storage, the cost of storage and interest, and the margin of profit or loss per barrel for each year from 1920 to 1927 are given in Table 15. These figures were derived from the monthly average prices given in Table 14. Since most of the Calhoun county Jonathans are harvested in September, the September average was taken as the harvest price. The harvest period for Winesap, Ben Davis, and Willow Twig apples extends thru October and November. Some seasons the Winesap harvest especially may be nearly completed in October, but other years it extends well into November. The average prices for October and November have therefore been taken to represent the harvest prices for these three varieties.

The market reports from which these price quotations were derived indicate that most of the barreled Jonathans stored in St. Louis were marketed in December, January, and February, and most of the Winesaps in January, February, March, and April, while most of the Ben Davis and Willow Twigs taken from storage were sold in February, March, April, and May. The average prices for these periods have therefore been taken as representative of the prices received for stored apples of the respective varieties.

Storage rates in St. Louis were reported as 60 to 70 cents a barrel for the season ending April 1, with an additional charge of 10 cents for each month or fraction of a month thereafter. On this basis the average storage charge for Jonathans and Winesaps has been figured at 70 cents a barrel and the average charge for Ben Davis and Willow Twigs at 80 cents a barrel. Interest has been figured at the rate of 6 percent a year on the average price at harvest time, beginning at the middle of the harvest period for the respective varieties and ending at the middle of the period for sales from storage as indicated above.

Margins Between Harvest and Storage Sales

During the period covered by these figures there were substantial margins above actual carrying charges on the three late winter varieties every year except two, and the average margin per year, including the two years of losses, was 44 cents, 67 cents, and 90 cents a barrel for Ben Davis, Winesaps, and Willow Twigs respectively. In the case of Jonathans there were substantial margins two years out of seven, small margins two years, and serious losses three years. The average

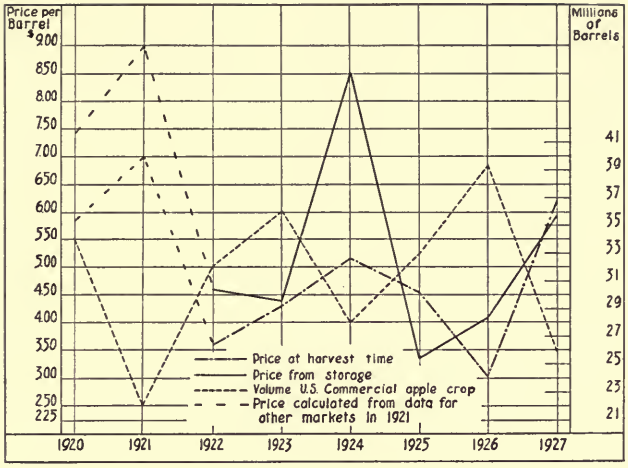

FIG. 21.—PRICES OF CALHOUN COUNTY JONATHANS AT HARVEST AND FROM STORAGE, SHOWING RELATION OF PRICES TO VOLUME OF UNITED STATES COMMERCIAL APPLE CROP

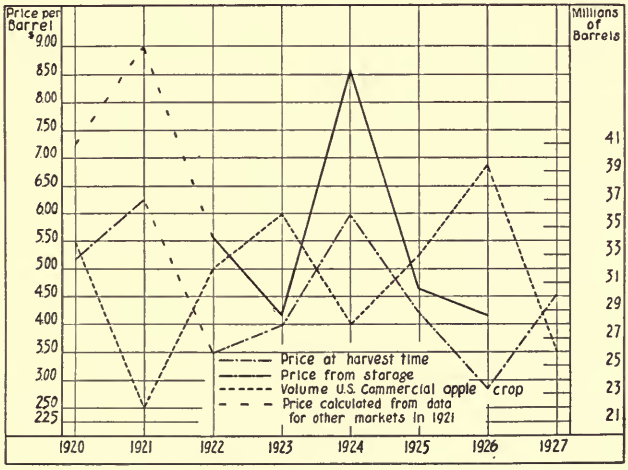

FIG. 22.—PRICES OF CALHOUN COUNTY WINESAPS AT HARVEST AND FROM STORAGE, SHOWING RELATION OF PRICES TO VOLUME OF UNITED STATES COMMERCIAL APPLE CROP

margin for the seven-year period was only one cent a barrel. This does not take into account any shrinkage, expense of repacking, other extra charges, or compensation for the assumption of risks involved. The loss on Jonathans in 1927-28, when Ben Davis and Wil-

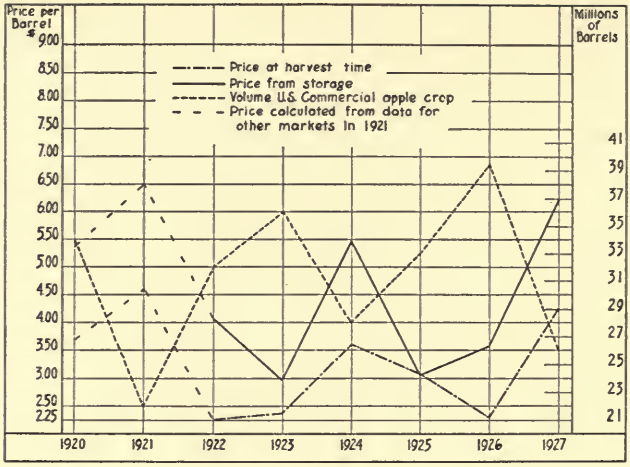

FIG. 23.—PRICES OF CALHOUN COUNTY BEN DAVIS APPLES AT HARVEST AND FROM STORAGE, SHOWING RELATION OF PRICES TO VOLUME OF UNITED STATES COMMERCIAL APPLE CROP

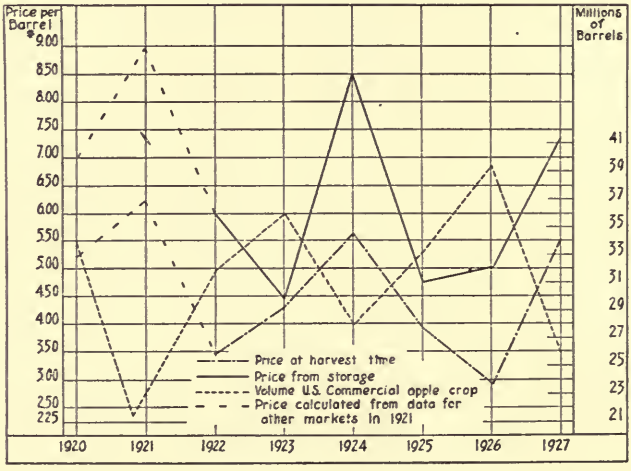

FIG. 24.—PRICES OF CALHOUN COUNTY WILLOW TWIGS AT HARVEST AND FROM STORAGE, SHOWING RELATION OF PRICES TO VOLUME OF UNITED STATES COMMERCIAL APPLE CROP

low Twigs showed a profit, was due partly to the heavy crop of Jonathans in the country as a whole and the poor keeping quality of some of the Jonathans from other regions. The Jonathans showed a wider range in selling price out of storage from year to year than any of the

other three varieties. It seems evident that the storage of Jonathans is more hazardous than the storage of the other varieties under consideration.

The relation of harvest prices for the given varieties to storage prices and to the volume of the commercial apple crop[1] in the country as a whole is shown graphically in Figs. 21, 22, 23, and 24. Since there were no quotations on barreled apples in the *St. Louis Daily Market Reporter* for the 1921-22 season due to crop failure in Calhoun county, the prices indicated in the charts for that season have been calculated from prices in other markets. Prices for the other years were taken from Table 15.

If a grower were to store about the same quantity of apples each year, especially of the later keeping varieties, his profits from storage in the more favorable years would, according to the figures given for the seven years, more than balance the losses in the unfavorable years. Furthermore, if a grower can regularly have the advice of an able and experienced fruit man who is intimately acquainted with marketing conditions and prospects, his opportunity to profit from storage will be increased.

RECOMMENDATIONS

1. *Restrict New Plantings to Standard Varieties.*—Any additional plantings of apples in Calhoun county should be restricted to standard commercial varieties that are adapted to the region and in good demand on the markets. This is in line with recent plantings and the policy should be continued.

2. *Wider Use of Improved Cultural Methods.*—The more general use of cultural methods favorable to the production of high-grade fruit should be encouraged. Thoro spraying and careful pruning are especially important. If all orchards in the county were given as good care as the best, the proportion of high-grade fruit from the county as a whole could be increased.

3. *Adoption of Standardized Grading.*—Standardized grading should be adopted as a county-wide practice. While there are different standards of grading that might be employed, the grade specifications recommended by the U. S. Department of Agriculture are the best-known in the trade in this and other states, and are used as the basis of shipping-point inspection in most apple regions east of the Rocky Mountains. These specifications are given on page 611. While these

[1]The commercial apple crops of the United States for the years under consideration, as given in government statistics, were as follows:

Year	Barrels	Year	Barrels
1920	33,905,000	1924	28,013,000
1921	21,557,000	1925	33,246,000
1922	31,945,000	1926	39,411,000
1923	35,936,000	1927	25,900,000*

*Subject to revision.

grade specifications may not seem entirely satisfactory to every packer, they are the only specifications now applicable to Illinois apples that are generally recognized in the trade,[1] and it would be much more satisfactory for all packers to follow them than for each to follow his own inclinations as so commonly has been the practice in the past. When all packers grade according to the same standards, the output from different orchards will be much more uniform. The packing of uniform, standardized grades thruout the county will do much toward enabling Calhoun county to acquire an enviable reputation as an apple-producing region.

In packing under the U. S. grade specifications it should be recognized that the 10 percentage of tolerance is allowed merely to permit rapid packing on a commercial basis without incurring any danger of failure to conform to the specifications. Purposely to include 7 or 8 percent of apples that are known to be below the requirement is almost sure to result in a pack that will exceed the 10 percent tolerance, for in spite of all the precautions that may be taken a few defective specimens will slip past the sorters. If each packer strives to make his pack considerably better than the minimum requirements, much more satisfactory packs will result and the reputation of the county will be enhanced.

4. *More General Use of Shipping-Point Inspection.*—Much help in standardizing the grading can be secured from the use of shipping-point inspection. To get the most benefit from this service a careful study should be made of the inspection report on each car as soon as it is completed and such changes made in the grading of the fruit for the next car as may be necessary to meet the requirements with a safe margin to spare. One of the chief advantages of shipping-point inspection lies in its educational value to the packer. Unless use is made of the information in the report to improve the subsequent packing where needed, the chief value of the inspection service is likely to be lost. Personal conferences with the inspector may be of assistance in interpreting the reports in some instances. Such conferences should be sought whenever additional information will help improve the pack.

5. *Greater Care in Packing Bushel Baskets.*—Special attention should be given to the packing of bushel baskets to insure a heavy pack that will not become slack during shipment or storage. The package must be thoroly shaken before it is completely filled. The facing layer must be especially tight and crowned considerably at the center. When mechanical packing devices are used, it will often be

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[1]Grading according to the provisions of the Illinois apple grading and packing law, passed in 1921, has never come into general use, and these grades are not well known in the trade.

necessary to insert a specimen or two of fruit in the facing layer just before the cover is put in place in order to make sure the pack is tight.

6. *Use of "Tub" Bushels.*—Fruit packed in bushels intended for storage should be in "tub" bushels rather than in round-bottom baskets. This type of package carries better in the car and stacks better with less danger of crushing in the storage house. There are great differences in the strength and rigidity of packages from different factories, and it is important that a good quality of tub bushel be used.

7. *Use of Apple Box for Fancy Fruit.*—The apple box must be used with discretion. It is a package designed primarily for fancy fruit. To make an attractive pack the specimens must be uniform in size. The wrapping of each apple is associated with box packing. Unless the fruit is fancy and the packer is prepared to attend to all

FIG. 25.—PACKING SHED OF FRANK DIRKSMEYER NEAR HAMBURG

This shed is equipped for box packing. It is one of the few apple packing sheds in Calhoun county.

the niceties involved in up-to-date box packing as practiced in the West, it is unwise to attempt this method of preparing apples for market. Under special conditions, however, a limited amount of fruit may be handled advantageously in this way.

8. *More Packing Sheds.*—Calhoun county needs more packing sheds. Orchard packing is especially precarious in wet weather. A rain lasting only a few minutes is sufficient to stop packing operations in the orchard until the fruit has dried off. In shed packing it is feasible to have enough fruit picked ahead to last the packers for a few hours so that packing may continue during intermittent rainfall. When shed packing is employed, the fruit may be picked slightly wet if necessary and allowed to dry in the shed before it is packed. Furthermore, in shed packing the packing equipment, the supply of packages, the packed fruit, and the packing crew are afforded protection

from unfavorable weather. Special equipment to facilitate grading and packing can more readily be employed in a shed than in the orchard. The sloping ground in some Calhoun county orchards adds to the inconvenience of orchard packing.

The use of packing sheds will facilitate standardized grading and reduce packing expense. The almost universal experience of people who have substituted shed packing for orchard packing has been the securing of a better pack at lower cost. One of the Calhoun county growers, C. L. Tureman of Hardin, kept an accurate account of his costs of shed packing in 1927 and found that he saved 5 cents a bushel and 15 cents a barrel as compared with the costs of orchard packing of his crop in 1926. The present outlook in the apple business over the country as a whole indicates that for the next few years profits are likely to accrue from reductions in packing and marketing costs rather than from increased prices. Since the use of sheds reduces the expense of packing, their use should become general thruout the county.

9. *Prompt Shipment After Picking.*—Precautions should be taken to insure the prompt shipment of apples after they are picked. The existing transportation facilities are adequate to move the crop promptly if they are utilized to their full capacity and the flow of apples from the orchards to the loading points is made as uniform as weather conditions will permit.

The transportation companies, both river and rail, should be fully informed considerably in advance of the crop movement each season regarding the approximate volume of apples that is likely to be shipped. A railroad needs about 30 days' time in which to assemble a supply of refrigerator cars for use in a given region if the number needed is greatly in excess of the requirements in previous years. Operators of transfer barges and ferries also should be advised regarding the probable crop movement in plenty of time to make any adjustments in equipment that may be necessary. Full preparations for the handling of the crop should be made long before the apples mature.

Delays in hauling fruit from the orchard to the loading point, or in loading after delivery at loading point should be avoided as much as possible. Purposely withholding shipment in the hope that market conditions may improve is of questionable value. If fruit is to be held for later market, it should be shipped promptly and placed in cold storage rather than held at the orchard or on the river bank.

10. *Better Utilization of Existing Cold-Storage Plants.*—So long as existing cold-storage plants that are readily accessible from Calhoun county have sufficient capacity for handling all the product, there would seem to be no adequate reason for erecting additional storage plants especially for the storage of apples produced in this region. There is no insurmountable barrier to prompt storage under existing conditions. Better utilization of the present transportation

facilities, and especially better planning in advance for the movement of the crop, will make prompt storage entirely feasible.

11. *Wider and More Direct Distribution.*—Advantage should be taken of the recent improvements in transportation facilities which have increased the number of markets that can readily be reached with Calhoun county apples at harvest time. The new rail and hard-road connections have made it much easier for persons interested in apples to get into the county. This situation should naturally lead to a wider distribution of the fruit since buyers, brokers, and dealers from various markets can now readily visit the region, inspect the growing crops, make the acquaintance of the growers, and become familiar with the shipping facilities.

FIG. 26.—THE MOST PRACTICAL WAY OF GETTING INTO CALHOUN COUNTY

There is not a bridge across either river into the county. With the present hard road connections, driving to the county by auto and crossing the river by ferry is the most expeditious way of entering this important apple-producing region.

The completion of the hard road to East St. Louis, thus connecting Calhoun county with the various industrial centers in that part of Illinois, presents an opportunity for many growers to truck their lower grades of fruit in bulk to these markets and there dispose of them at reasonable prices and without excessive marketing expense. Such disposition of off-grade fruit, instead of consigning it to the St. Louis market, will be a benefit to the people of these towns and will also have a tendency to improve the conditions in St. Louis for the sale of the better grades of fruit. Distribution of apples by truck to the manufacturing towns and trading centers within hauling distance east and southeast of Calhoun county should become an important factor in the handling of the crop now that hard-road connections have been established.

12. *Marketing Arrangements Before Harvest.*—Marketing arrangements should be made considerably in advance of the crop move-

ment whether the fruit is to be handled thru a buyer, a broker, or a commission merchant. It is a wise practice for the grower not to wait indefinitely in the hope that some buyer may become particularly eager to secure his crop. In many instances the grower should take the initiative and personally call upon the dealer he has decided he would like to have handle his crop, after assuring himself of the business ability and financial integrity of the dealer in question. With the present hard-road system it is not difficult for a grower to drive to St. Louis, for instance, for a conference with a dealer regarding his crop.

13. *Personal Contact With Marketing Agency.*—Personal contact should be maintained with the marketing agency thruout the harvest season. After business connections have been established, there is great advantage to the grower in keeping his dealer fully advised from day to day regarding shipments in transit and in prospect. Telephone tolls are good investments when apples are being harvested. If goods are sent on consignment, it is especially important that the dealer know exactly what quantities and grades are included in each shipment. With such information in advance, it is often possible for the dealer to sell the apples before they arrive. This is especially true in the case of fruit that is graded according to definite standards.

14. *Maintenance of Satisfactory Connections Once Established.*—There is much cumulative advantage to be gained for both grower and dealer by maintenance of the same marketing connections year after year, after satisfactory contacts have once been made. Under such circumstances it is possible for both to profit from the reputation established in previous years. Especially in years of heavy crop is the grower with regular connections and an established reputation at a decided advantage. At such times market preference is a tangible asset.

Whether the apples are to be sold at harvest time or stored for later sale, there is the same advantage in having established marketing connections and a definite marketing plan.

OFFICIAL STANDARDS FOR THE INSPECTION OF APPLES[1]

U. S. Fancy shall consist of apples of one variety which are mature but not overripe, carefully hand picked, clean, well formed, free from decay, broken skins and bruises except those incident to proper packing, sprayburn, stings or other insect injury, sunscald, visible watercore, and from injury by russeting, limbrubs, hail or mechanical or other means. Each apple of this grade shall have the amount of color specified hereinafter for the variety. (See size requirements.)

In order to allow for variations incident to proper grading and handling, not more than a total of 10 percent, by weight, of the apples in any lot may be below the requirements of this grade, but not to exceed one-half of this tolerance, or 5 percent, shall be allowed for defects causing serious damage, and not more than one-fifth of this amount or 1 percent shall be allowed for decay.

U. S. No. 1 shall consist of apples of one variety which are mature but not overripe, carefully hand-picked, clean, fairly well formed, free from decay, broken skins, and bruises except those incident to proper packing and damage caused by limbrubs, sprayburn, sunscald, russeting, hail, visible watercore, disease, insects or mechanical or other means. Each apple of this grade shall have the amount of color specified hereinafter for the variety. (See size requirements.)

In order to allow for variations incident to proper grading and handling, not more than a total of 10 percent, by weight, of the apples in any lot may be below the requirements of this grade, but not more than one-tenth of this amount or 1 percent shall be allowed for decay. [This same tolerance applies to the U. S. Commercial and U. S. No. 2 grades.]

U. S. Commercial shall consist of apples of one variety which meet the requirements of U. S. No. 1 except as to color, and provided further that early varieties such as Duchess of Oldenburg, Red June, Wealthy, Williams and other varieties which ripen at the same period need not be mature. (See size requirements.)

U. S. No. 2 shall consist of apples of one variety which are mature but not overripe, free from decay and from serious damage caused by dirt or other foreign matter, bruises, sprayburn, sunscald, russeting, hail, disease, insects or mechanical or other means. (See size requirements.)

Unclassified shall consist of apples which are not graded in conformity with any of the foregoing grades.

Color Requirements

In addition to the foregoing requirements for U. S. No. 1 and U. S. Fancy, each apple of these grades must have the percentage of color shown in the list below. "Color" means a good shade of red characteristic of the variety. Faded brown stripes shall not be considered as color.

U. S. Fancy, 50 percent; U. S. No. 1, 25 percent: Arkansas Black, Delicious, Gano, Jonathan, King David, Missouri Pippin, Winesap, and other similar varieties.

U. S. Fancy, 33 percent; U. S. No. 1, 15 percent: Arkansas (Mammoth Black Twig), Ben Davis, Ralls (Geneton), Rome Beauty, Stayman Winesap, Wealthy, Willow Twig, York Imperial, and other similar varieties.

U. S. Fancy, 25 percent; U. S. No. 1, 10 percent: Duchess of Oldenburg, Red Astrachan, and other similar varieties.

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[1]These standards issued June 30, 1927, by the Bureau of Agricultural Economics of the U. S. Department of Agriculture, apply to apples packed in containers other than the standard northwestern apple box.

Size Requirements

The minimum size of the apples in any closed container shall be plainly stamped, stenciled, or otherwise marked on the container. "Minimum size" means the transverse diameter of the smallest apples permitted in the container taken at right angles to a line running from the stem to the blossom end. Minimum sizes shall be stated in terms of whole and quarter inches, as 2¼ inches minimum, 2½ inches minimum, in accordance with the facts.

In order to allow for variations incident to proper sizing, not more than 5 percent, by weight, of the apples in any container may be below the specified minimum size. Where the maximum and minimum sizes are both stated, an additional 10 percent tolerance is provided for apples which are larger than the maximum size stated.

Packing Requirements

Each package shall be packed so that the apples in the shown face shall be reasonably representative in size, color, and quality, of the contents of the package.

Definitions of Terms

As used in these grades:

"Mature" means having reached the stage of maturity which will insure the proper completion of the ripening process.

"Clean" means free from excessive dirt, dust, spray residue or other foreign material.

"Well formed" means that the apples have the shape characteristic of the variety in the locality where grown.

"Fairly well formed" means that the apples may be slightly abnormal in shape but not to an extent which detracts materially from the appearance of the fruit.

"Damage" means any injury or defect which materially affects the appearance or keeping quality. Any one of the following defects, or any combination thereof, the seriousness of which exceeds the maximum allowed for any one defect shall be considered as damage:

Limbrubs	Dark brown over ½ inch in diameter. Light brown over 1 inch in diameter.
Sprayburn or sunscald	Color materially changed; skin blistered or cracked.
Russeting	Smooth, net-like over more than one-fourth of surface. Smooth solid, over more than one-tenth of surface. Rough or bark-like area more than ½ inch in diameter.
Hail marks	Skin broken; or superficial marks exceeding ½ inch in the aggregate.
Scab	Spots not corked over or corked over spots affecting a total area of more than ¼ inch in diameter.
Insect stings, healed	More than 2, either of which is over ⅛ inch in diameter.
Cedar rust	Aggregate area over ¼ inch in diameter.
Worm holes	Any.
Sooty blotch or fly speck	Thinly scattered over more than one-tenth of surface or dark, heavily concentrated spots affecting an area more than ½ inch in diameter.

"Serious damage" means any injury or defect which seriously affects the appearance or keeping quality.

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